CLAIMS

I claim:

1. An array assembly of solid state lighting (SSL) dies, comprising:

a first terminal;

a second terminal, the first terminal and the second terminal being configured to receive an input voltage (V_o); and

a plurality of SSL dies coupled between the first terminal and the second terminal with at least a pair of the SSL dies being coupled in parallel, wherein:

the plurality of SSL dies individually include a plurality of junctions with a total forward junction voltage (V_{tot}) less than or generally equal to the input voltage (V_o); and

the individual SSL dies have a value of flux/die area (J/A) that is within a threshold of a target value of flux/die area (J/A_{target}).

2. The array assembly of claim 1 wherein:

a number of the plurality of SSL dies is equal to a total target flux (J_{tot}) divided by the target value of flux/die area (J/A_{target}) as follows:

$$n = \frac{J_{tot}}{J/A_{target}}$$

where n is the number of the plurality of SSL dies;

the individual SSL dies have a total forward junction voltage (V_{tot}) that is generally equal to the input voltage (V_o);

a number of junctions in the individual SSL dies is as follows:

$$m = \frac{V_o}{\Delta V}$$

where m is the number of junctions in the individual SSL dies and ΔV is a forward junction voltage of a single junction; and

all of the plurality of SSL dies are coupled between the first terminal and the second terminal in parallel to one another.

3. The array assembly of claim 1 wherein:

the plurality of SSL dies individually include a plurality of junctions coupled in series; and

the total forward junction voltage (V_{tot}) of the individual SSL dies is as follows:

$$V_{tot} = m \times \Delta V$$

where m is a number of junctions in the individual SSL dies and ΔV is a forward junction voltage of a single junction.

4. The array assembly of claim 1 wherein:

a number of the plurality of SSL dies is equal to a total target flux (J_{tot}) divided by the target value of flux/die area (J/A_{target}) as follows:

$$n = \frac{J_{tot}}{J/A_{target}}$$

where n is the number of the plurality of SSL dies.

5. The array assembly of claim 1 wherein:

a number of the plurality of SSL dies is equal to a total target flux (J_{tot}) divided by the target value of flux/die area (J/A_{target}) as follows:

$$n = \frac{J_{tot}}{J/A_{target}}$$

where n is the number of the plurality of SSL dies.

6. The array assembly of claim 1 wherein:

a number of the plurality of SSL dies is equal to a total target flux (J_{tot}) divided by the target value of flux/die area (J/A_{target}) as follows:

$$n = \frac{J_{tot}}{J/A_{target}} + 1$$

where n is the number of the plurality of SSL dies.

7. The array assembly of claim 1 wherein:

a number of junctions in the individual SSL dies is as follows:

$$m = \frac{V_o}{\Delta V}$$

where m is the number of junctions in the individual SSL dies and ΔV is a forward junction voltage of a single junction; and

all of the plurality of SSL dies are coupled between the first terminal and the second terminal in parallel to one another.

8. The array assembly of claim 1 wherein:

the plurality of SSL dies are arranged as multiple strings individually having multiple SSL dies coupled in series; and

the individual SSL dies have a total forward junction voltage (V_{tot}) that is less than the input voltage (V_o).

9. The array assembly of claim 1 wherein:

the plurality of SSL dies are arranged as multiple strings individually having multiple SSL dies coupled in series;

the individual SSL dies have a total forward junction voltage (V_{tot}) that is less than the input voltage (V_o); and

a number of junctions in the individual SSL dies is as follows:

$$m = \frac{V_{tot}}{\Delta V}$$

where m is the number of junctions in the individual SSL dies and ΔV is a forward junction voltage of a single junction.

10. The array assembly of claim 1 wherein all of the plurality of SSL dies include the same number of junctions.

11. The array assembly of claim 1 wherein at least some of the plurality of SSL dies include a number of junctions different than the other SSL dies.

12. An array assembly of solid state lighting (SSL) dies, comprising:

a first terminal;

a second terminal, the first terminal and the second terminal being configured to receive an input voltage (V_o); and

a plurality of SSL dies coupled between the first terminal and the second terminal, the plurality of SSL dies individually having a plurality of junctions coupled in series with a total forward junction voltage (V_{tot}) greater than a forward junction voltage (ΔV) of a single junction but less than or equal to the input voltage (V_o).

13. The array assembly of claim 12 wherein:

the total forward junction voltage (V_{tot}) of the individual SSL dies is as follows:

$$V_{tot} = m \times \Delta V$$

where m is a number of junctions in the individual SSL dies and ΔV is a forward junction voltage of a single junction.

14. The array assembly of claim 12 wherein:

all of the plurality of SSL dies are coupled in parallel to one another;

the total forward junction voltage (V_{tot}) of the individual SSL dies is as follows:

$$V_{tot} = V_o$$

a number of junctions in the individual SSL dies is as follows:

$$m = \frac{V_o}{\Delta V}$$

where m is the number of junctions in the individual SSL dies.

15. The array assembly of claim 12 wherein:

at least some of the SSL dies are coupled in series;

the input voltage (V_o) is a multiple of the total forward junction voltage (V_{tot}) of the individual SSL dies as follows:

$$V_o = k \times V_{tot}$$

where k is a positive integer; and

a number of junctions in the individual SSL dies is as follows:

$$m = \frac{V_o}{k\Delta V}$$

where m is the number of junctions in the individual SSL dies.

16. The array assembly of claim 12 wherein all of the plurality of SSL dies have a generally similar value of flux/die area (J/A).

17. The array assembly of claim 12 wherein at least one of the plurality of SSL dies has a value of flux/die area (J/A) different than other SSL dies.

18. A method of manufacturing an array assembly of solid state lighting (SSL) dies, comprising:

determining a total flux (J_{tot}), a target flux/die area (J/A_{target}), and an input voltage (V_o) of the array assembly;

calculating a number of SSL dies for the array assembly based at least in part on the total flux (J_{tot}) and the target flux/die area (J/A_{target});

determining a number of junctions in the individual SSL dies based at least in part on the input voltage (V_o); and

coupling the calculated number of SSL dies with the determined number of junctions between a first terminal and a second terminal in parallel.

19. The method of claim 18 wherein calculating a number of SSL dies includes:

calculating the number of SSL dies for the array assembly as follows:

$$n = \frac{J_{tot}}{J/A_{target}}$$

where n is the number of the plurality of SSL dies.

20. The method of claim 18 wherein calculating a number of SSL dies includes:

calculating the number of SSL dies for the array assembly as follows:

$$n = [\frac{J_{tot}}{J/A_{target}}]$$

where n is the number of the plurality of SSL dies.

21. The method of claim 18 wherein calculating a number of SSL dies includes:

calculating the number of SSL dies for the array assembly as follows:

$$n = [\frac{J_{tot}}{J/A_{target}}] + 1$$

where n is the number of the plurality of SSL dies.

22. The method of claim 18 wherein calculating a number of SSL dies includes:

calculating a number (n) of SSL dies for the array assembly as follows:

$$n = [\frac{J_{tot}}{J/A_{target}}]$$

calculating a value of flux/die area (J/A) based on the total flux (J_{tot}) and the calculated number of SSL dies as follows:

$$J/A = \frac{J_{tot}}{n}$$

comparing the calculated value of flux/die area (J/A) to a target value of flux/die area (J/A_{target});

if the calculated value of flux/die area (J/A) is within a threshold of the target value of flux/die area (J/A_{target}), then setting the number of SSL dies to n; and

if the calculated value of flux/die area (J/A) is not within the threshold of the target value of flux/die area (J/A_{target}), then setting $n = n+1$ or $n = n-1$, and repeating the calculating of the value of flux/die area (J/A) and comparing of the calculated value of flux/die area (J/A) to the target value of flux/die area (J/A_{target}).

23. The method of claim 18 wherein determining a number of junctions includes:

determining the number of junctions for the individual SSL dies as follows:

$$m = \frac{V_o}{\Delta V}$$

where m is the number of junctions in the individual SSL dies.

24. The method of claim 18 wherein determining a number of junctions includes:

determining the number of junctions for the individual SSL dies as follows:

$$m = \frac{V_o}{k\Delta V}$$

where m is the number of junctions in the individual SSL dies and k is a positive integer.

CLAIMS

I claim:

1. An array assembly of solid state lighting (SSL) dies, comprising:

a first terminal;

a second terminal, the first terminal and the second terminal being configured to receive an input voltage (V_o); and

a plurality of SSL dies coupled between the first terminal and the second terminal with at least a pair of the SSL dies being coupled in parallel and biased in the same direction, wherein:

the plurality of SSL dies individually include a plurality of junctions with a total forward junction voltage (V_{tot}) less than or generally equal to the input voltage (V_o); and

the individual SSL dies have a value of flux/die area (J/A) that is within a threshold of a target value of flux/die area (J/A_{target}).

2. The array assembly of claim 1 wherein:

a number of the plurality of SSL dies is equal to a total target flux (J_{tot}) divided by the target value of flux/die area (J/A_{target}) as follows:

$$n = \frac{J_{tot}}{J/A_{target}}$$

where n is the number of the plurality of SSL dies;

the individual SSL dies have a total forward junction voltage (V_{tot}) that is generally equal to the input voltage (V_o);

a number of junctions in the individual SSL dies is as follows:

$$m = \frac{V_o}{\Delta V}$$

where m is the number of junctions in the individual SSL dies and ΔV is a forward junction voltage of a single junction; and

all of the plurality of SSL dies are coupled between the first terminal and the second terminal in parallel to one another.

3. The array assembly of claim 1 wherein:

the plurality of SSL dies individually include a plurality of junctions coupled in series; and

the total forward junction voltage (V_{tot}) of the individual SSL dies is as follows:

$$V_{tot} = m \times \Delta V$$

where m is a number of junctions in the individual SSL dies and ΔV is a forward junction voltage of a single junction.

4. The array assembly of claim 1 wherein:

a number of the plurality of SSL dies is equal to a total target flux (J_{tot}) divided by the target value of flux/die area (J/A_{target}) as follows:

$$n = \frac{J_{tot}}{J/A_{target}}$$

where n is the number of the plurality of SSL dies.

5. The array assembly of claim 1 wherein:

a number of the plurality of SSL dies is equal to a total target flux (J_{tot}) divided by the target value of flux/die area (J/A_{target}) as follows:

$$n = \frac{J_{tot}}{J/A_{target}} + 1$$

where n is the number of the plurality of SSL dies.

6. The array assembly of claim 1 wherein:

a number of junctions in the individual SSL dies is as follows:

$$m = \frac{V_o}{\Delta V}$$

where m is the number of junctions in the individual SSL dies and ΔV is a forward junction voltage of a single junction; and

all of the plurality of SSL dies are coupled between the first terminal and the second terminal in parallel to one another.

7. The array assembly of claim 1 wherein:

the plurality of SSL dies are arranged as multiple strings individually having multiple SSL dies coupled in series; and

the individual SSL dies have a total forward junction voltage (V_{tot}) that is less than the input voltage (V_o).

8. The array assembly of claim 1 wherein:

the plurality of SSL dies are arranged as multiple strings individually having multiple SSL dies coupled in series;

the individual SSL dies have a total forward junction voltage (V_{tot}) that is less than the input voltage (V_o); and

a number of junctions in the individual SSL dies is as follows:

$$m = \frac{V_{tot}}{\Delta V}$$

where m is the number of junctions in the individual SSL dies and ΔV is a forward junction voltage of a single junction.

9. The array assembly of claim 1 wherein all of the plurality of SSL dies include the same number of junctions.

10. The array assembly of claim 1 wherein at least some of the plurality of SSL dies include a number of junctions different than the other SSL dies.

11. The array assembly of claim 1, further comprising:

a first string having a first portion of the plurality of SSL dies arranged in series; and

a second string in parallel with the first string, and the second string having a second portion of the plurality of dies arranged in series.

12. The array assembly of claim 1, further comprising:

a plurality of strings individually arranged in parallel with one another, wherein each of the plurality of strings has two or more branches arranged in parallel, and wherein each branch carries at least one of the plurality of SSL dies;

wherein at least one of the plurality of branches carries two or more of the plurality of SSL dies arranged in series.

13. An array assembly of solid state lighting (SSL) dies, comprising::

a first terminal;

a second terminal, the first terminal and the second terminal being configured to receive an input voltage (V_o);

a plurality of SSL dies coupled between the first terminal and the second terminal, the plurality of SSL dies individually having a plurality of junctions coupled in series with a total forward junction voltage (V_{tot}) greater than a forward junction voltage (ΔV) of a single junction but less than or generally equal to the input voltage (V_o);

all of the plurality of SSL dies are coupled in parallel to one another and biased in the same direction; and

the total forward junction voltage (V_{tot}) of the individual SSL dies is as follows:

$$V_{tot} = V_o$$

a number of junctions in the individual SSL dies is as follows:

$$m = \frac{V_o}{\Delta V}$$

where m is the number of junctions in the individual SSL dies.

14. The array assembly of claim 13 wherein:

at least some of the SSL dies are coupled in series;

the input voltage (V_o) is a multiple of the total forward junction voltage (V_{tot}) of the individual SSL dies as follows:

$$V_o = k \times V_{tot}$$

where k is a positive integer; and

a number of junctions in the individual SSL dies is as follows:

$$m = \frac{V_o}{k\Delta V}$$

where m is the number of junctions in the individual SSL dies.

15. The array assembly of claim 13 wherein all of the plurality of SSL dies have a generally similar value of flux/die area (J/A).

16. The array assembly of claim 13 wherein at least one of the plurality of SSL dies has a value of flux/die area (J/A) different than other SSL dies.

17. A method of manufacturing an array assembly of solid state lighting (SSL) dies, comprising:

determining a total flux (J_{tot}), a target flux/die area (J/A_{target}), and an input voltage (V_o) of the array assembly;

calculating a number of SSL dies for the array assembly based at least in part on the total flux (J_{tot}) and the target flux/die area (J/A_{target});

determining a number of junctions in the individual SSL dies based at least in part on the input voltage (V_o); and

coupling the calculated number of SSL dies with the determined number of junctions between a first terminal and a second terminal in parallel and biased in the same direction.

18. The method of claim 17 wherein calculating a number of SSL dies includes:

calculating the number of SSL dies for the array assembly as follows:

$$n = \frac{J_{tot}}{J/A_{target}}$$

where n is the number of the plurality of SSL dies.

19. The method of claim 17 wherein calculating a number of SSL dies includes:

calculating the number of SSL dies for the array assembly as follows:

$$n = [\frac{J_{tot}}{J/A_{target}}] + 1$$

where n is the number of the plurality of SSL dies.

20. The method of claim 17 wherein calculating a number of SSL dies includes:

calculating a number (n) of SSL dies for the array assembly as follows:

$$n = [\frac{J_{tot}}{J/A_{target}}]$$

calculating a value of flux/die area (J/A) based on the total flux (J_{tot}) and the calculated number of SSL dies as follows:

$$J/A = \frac{J_{tot}}{n}$$

comparing the calculated value of flux/die area (J/A) to a target value of flux/die area (J/A_{target});

if the calculated value of flux/die area (J/A) is within a threshold of the target value of flux/die area (J/A_{target}), then setting the number of SSL dies to n; and

if the calculated value of flux/die area (J/A) is not within the threshold of the target value of flux/die area (J/A_{target}), then setting $n = n+1$ or $n = n-1$, and repeating the calculating of the value of flux/die area (J/A) and comparing of the calculated value of flux/die area (J/A) to the target value of flux/die area (J/A_{target}).

21. The method of claim 17 wherein determining a number of junctions includes:

determining the number of junctions for the individual SSL dies as follows:

$$m = \frac{V_o}{\Delta V}$$

where m is the number of junctions in the individual SSL dies.

22. The method of claim 17 wherein determining a number of junctions includes:

determining the number of junctions for the individual SSL dies as follows:

$$m = \frac{V_o}{k\Delta V}$$

where m is the number of junctions in the individual SSL dies and k is a positive integer.